

Precalculus

Common to both Cores (based on new core language)	New Core Only	Old Core Only
	<p><i>Standard I: Students will use the language and operations of algebra to evaluate, analyze and solve problems.</i></p> <p>Objective 1: Compute with matrices and use matrices to solve problems.</p> <ul style="list-style-type: none"> • Represent real-world situations with matrices. • Add, subtract, and multiply (including scalar multiplication) matrices using paper and pencil, and computer programs or calculators. • Demonstrate that matrix multiplication is associative and distributive, but not commutative. • Determine additive and multiplicative identities and inverses of a matrix when they exist. • Solve systems of linear equations with up to three variables using matrices. 	
<p>Objective 2: Analyze the behavior of sequences and series.</p> <ul style="list-style-type: none"> • Identify arithmetic and geometric sequences and series. 	<ul style="list-style-type: none"> • Describe a sequence as a function where the domain is the set of natural numbers. • Represent sequences and series using various notations. • Discover and justify the formula for a finite arithmetic series. • Discover and justify the formulas for finite and infinite geometric series. 	<ul style="list-style-type: none"> • Generate arithmetic and geometric sequences • Identify a geometric series as convergent or divergent
<p><i>Standard II: Students will understand and represent functions and analyze function behavior.</i></p> <p>Objective 1: Analyze and solve problems using polynomial functions.</p>	<ul style="list-style-type: none"> • Raise a binomial to a power using Pascal's Triangle. • Determine the number and nature of solutions to polynomial equations with real coefficients over the complex numbers. • Factor polynomials to solve equations and real- 	<ul style="list-style-type: none"> • Simplify expressions or solve equations using a variety of approaches and techniques, e.g., polynomial long division, Rational Root Theorem, and partial fractions.

<ul style="list-style-type: none"> Raise a binomial to a power using the Binomial Theorem 	<ul style="list-style-type: none"> world applications. Understand the relationships among the solutions of a polynomial equation, the zeros of a function, the x-intercepts of a graph, and the factors of a polynomial. Write an equation with given solutions. 	
<p>Objective 2: Model and graph functions and transformations of functions.</p> <ul style="list-style-type: none"> Identify the effects of changing the parameter a in $y = af(x)$, $y = f(ax)$, $y = f(x - a)$, and $y = f(x) + a$, given the graph of $y = f(x)$. 	<ul style="list-style-type: none"> Model real-world relationships with functions. Graph rational, piece-wise, power, exponential, and logarithmic functions. 	<ul style="list-style-type: none"> Identify the domain and range of a function resulting from the combination or composition of functions. (Algebra 2)
<p>Objective 3: Analyze the behavior of functions.</p> <ul style="list-style-type: none"> Identify the domain, range, and other attributes of families of functions and their inverses. Approximate instantaneous rates of change and find average rates of change using graphs and numerical data. Identify and analyze continuity, end behavior, asymptotes, symmetry (odd and even functions), and limits, and connect these concepts to graphs of functions. Determine intervals over which a function is increasing or decreasing, and describe the intervals using interval notation. Relate the graphical representation of discontinuities and end behavior to the concept of limit. 		<ul style="list-style-type: none"> Find the x- and y-intercepts, zeros, maxima, and minima of functions.
	<p><i>Standard III: Students will use algebraic, spatial, and logical reasoning to solve geometry and measurement problems.</i></p> <p>Objective 1: Solve problems using trigonometry.</p>	

	<ul style="list-style-type: none"> Define the six trigonometric functions using the unit circle. Prove trigonometric identities using definitions, the Pythagorean Theorem, or other relationships. Simplify trigonometric expressions and solve trigonometric equations using identities. Solve problems using the Law of Sines and the Law of Cosines. Construct the graphs of the trigonometric functions and their inverses, and describe their behavior, including periodicity and amplitude. 	
Objective 2: Graph curves using polar and parametric equations. <ol style="list-style-type: none"> Define and use polar coordinates and relate them to Cartesian coordinates. Represent complex numbers in rectangular and polar form, and convert between rectangular and polar form. Translate equations in Cartesian coordinates into polar coordinates and graph them in the polar coordinate plane. 	<ul style="list-style-type: none"> Define a curve parametrically and draw parametric graphs. Multiply complex numbers in polar form and use DeMoivre's Theorem to find roots of complex numbers. 	<ul style="list-style-type: none"> Add, subtract, multiply, and find the absolute value using complex numbers Analyze properties of complex numbers and their effects on operations in rectangular and polar form. Write functions and relations in parametric form.
Objective 3: Solve problems involving the geometric properties of conic sections. <ul style="list-style-type: none"> Write equations of conic sections in standard form. Identify the geometric properties of conic sections (i.e., vertex, foci, lines of symmetry, directrix, major and minor axes, and asymptotes). 	<ul style="list-style-type: none"> Solve real-world applications of conic sections. 	
<i>Standard IV: Students will understand concepts from probability and statistics and apply statistical methods to solve problems.</i> Objective 1: Compute probabilities for discrete distributions and use sampling distributions to	<ul style="list-style-type: none"> Compute binomial probabilities using Pascal's Triangle and the Binomial Theorem. Compute means and variances of discrete random variables. Compute probabilities using areas under the 	<ul style="list-style-type: none"> Find sample spaces and probability distributions in simple cases. Differentiate between independent and dependent events and calculate the probability

<p>calculate approximate probabilities.</p> <ul style="list-style-type: none"> Obtain sample spaces and probability distributions for simple discrete random variables. 	<p>Normal Curve.</p> <ul style="list-style-type: none"> Calculate parameters of sampling distributions for the sample average, sum, and proportion. Calculate probabilities in real problems using sampling distributions. 	<p>of each.</p> <ul style="list-style-type: none"> Calculate the conditional probability of an event. Calculate the probability of a compound event. Calculate and interpret the expected value (weighted average) of random variables in simple cases.
<p>Objective 2: Analyze bivariate data using linear regression methods.</p> <ul style="list-style-type: none"> Compute predictions of y-values for given x-values using a regression equation, and recognize the limitations of such predictions. 	<ul style="list-style-type: none"> Fit regression lines to pairs of numeric variables and calculate the means and standard deviations of the two variables and the correlation coefficient, using technology. Compute and use the standard error for regression. 	<ul style="list-style-type: none"> Find regression equation for bivariate data including power, exponential, logarithmic, polynomial, and sinusoidal curves using technology. Identify how sample statistics reflect population parameters.
		<ul style="list-style-type: none"> Vectors Develop and use the limit definition of e. Solve equations and inequalities involving exponential, logarithmic, power, polynomial, rational, and trigonometric functions, including real world situations. (Algebra 2) Compare logarithmic and exponential functions. (Algebra 2) Combine and compose functions using algebraic methods or by using technology when appropriate. (Algebra 2) Solve systems of non-linear equations and inequalities. (Algebra 2) Represent quantitative, real-world situations using exponential, logarithmic, power, polynomial, rational, and trigonometric functions, vector and parametric equations, and sequences and series. Select appropriate units and scales and recognize changes in magnitude in various measurement scales.